dence, with a strong hope that the labours of M. Double, in whose hands the details of M. Civiale's observations are placed, and the anxiously desired returns of MM. Amussat, Huerteloup, &c. &c. will soon place the profession in possession of more valuable data. At present, the cause of an operation, the extension of which we ardently desire and confidently expect, appears to be suffering almost as much from its friends as from its foes. We have been led thus prematurely into a long notice of this operation by its great importance in surgery, and the anxiety of the profession on the subject, and shall endeavour hereafter to keep pace with the current of events. R. C.

ART. XII. *Illustrations of the Elementary Forms of Disease.* By ROBERT CARSWELL, M. D. Professor of Pathological Anatomy in the University of London. London, 1833-4. Parts 4, 5.

THE fourth and fifth fasciculi of Carswell's pathology sustain the impression expressed in a former number of this journal, (No. XXVIII. for August, 1834, p. 418,) that Dr. Carswell possessed the requisite ability and the peculiar cast of mind requisite for the arrangement of the morbid products under a systematic and natural classification. The fourth number embraces an account of those degenerations, which, from their peculiar colour, have been termed *melanic.* Melanoma is defined by our author as "a morbid product of a black colour, varying in its intensity, humid, opaque, and of the consistence and homogeneous aspect of the tissue of the bronchial glands of the adult."

As some difference of opinion exists among pathologists as to what productions should be classed under the head of melanosis, the work before us divides them into *true* and *spurious;* by this arrangement every morbid product resembling melanosis will be provided a location; while true melanotic degeneration will be more accurately and clearly defined.

True melanosis is a a morbid product of secretion of a deep brown or black colour, presenting no evidence of organization; its form and consistence vary greatly, and are dependent upon the influence exerted by external agents. The most frequent location of this deposit is on the serous surfaces, and in the cellular tissue entering into the formation of organs; not unfrequently it will be found blended with the molecular structure of the organ, as by the process of nutrition; lastly, it sometimes exists in the blood, and particularly in that found in the venous capillaries. The physical characters of true melanosis comprise the form, consistence and colour, which it assumes in the different structures of the body.

Form.—The condition in which Dr. Carswell found melanic productions was either in points, which he styles punctiform, or in nodes or masses,—the tuberiform; in layers, the stratiform; or in the fluid state, the liquiform.

The punctiform arrangement of melanosis is most usually found in the liver, scattered through the organ in small dots, which when examined by the microscope, have a stellated or penicillated distribution, and in many instances can be distinctly seen to be the black matter in the extreme terminations of the venous vessels. At other times it is found to be deposited in the molecular structure of the organ, and intimately blended with the natural elements of the acini. The morbid material in this arrangement varies from a gray to a deep black hue.

Tuberiform melanosis is by far a more frequent occurrence than either of the other forms, and is situated on the serous surfaces, in the cellular and adipose tissue, or in the structure of every organ. When located on the serous surfaces, the form is generally globular; while the masses deposited in the substance of organs vary greatly in form and volume. This arrangement is frequently found united with the punctiform in the liver, and appears to be an advanced stage of it, depending upon successive depositions by the nutritive power of the organ. The suggestion would naturally arise, that if this is but a state or stage in the development of the first, it is unnecessary to constitute it a distinct class. We cannot for our own part discover any satisfactory reason for separating these two forms, unless it is designed to distinguish these punctiform deposits which are stellated or penicillated before the lens, from those which are essentially confined to the acini and dependent upon the process of nutrition for their development, and which alone can give rise to the second character of melanosis.

When the melanotic tumour is incased in a fibrous sac, it is said to be encysted; this form is found only in the cellular or adipose tissue, and is owing to the gradual distension and condensation of the cellular texture. The stratiform melanic deposition is met with upon the free surfaces, and consists in a distinct layer, resembling jelly spread over the surface, and is enclosed in a soft and spongy cellular tissue or delicate transparent serous membrane of new formation. It is not often met with in man, but in the horse it is frequently found upon the peritoneum, pleura and pericardium. Liquiform melanosis is generally confined to natural or accidental serous cavities; the peritoneum and pleura are the only membranes which have as yet furnished instances of this character of degeneration. Dr. Carswell has never found it in man as a product of secretion, but has seen it as the consequence of the destruction of melanotic tumours, and the effusion of their contents into serous cavities when their walls had been perforated. BRESCHET, ANDRAL and CRUVEILHIER, have discovered the liquiform melanosis on the surface of the mucous membrane, or in the cavity of the stomach; but our author thinks they have confounded it with the discoloration of the blood, which is produced by the action of the gastric juice upon it when effused.

The bulk of melanotic tumours is extremely variable, varying from a mustard seed to the size of an orange. The largest masses being found in the loose cellular tissue; sometimes a single and entire mass; at another composed of an assemblage of smaller ones. The colour, like the bulk of the tumour, is not determinate, presenting us every shade, from a light brown to a deep black; this variety in shade is not so much owing to the colouring matter which enters into the formation of this morbid production, as to the quantity of cellular membrane blended with it.

The consistence of melanosis is determined by two circumstances—the texture and form of the organ in which it is located. If the deposit is on a free surface, or in a loose cellular texture, then the matter is found in the fluid state; on the contrary, if the texture of the organ is dense and firm, it assumes a compact of solid consistence. LAENNEC asserts with great confidence and pertinacity, that melanosis is from the onset of its deposition a solid product; this opinion, however, is ably confuted by the concurrent testimony of many highly reputable pathologists; indeed, many agree with our author, that on the free surfaces of secreting membranes it is always fluid in the commencement, and when thereafter it becomes solid, it is dependent upon the cellular tissue in which it is deposited. The solid deposit after a given time ceases to increase in bulk, and ultimately softens and assumes almost the fluid state. This process of softening is not accomplished by any vital power of the melanic deposit or its surrounding texture, but is effected solely by the destruction of the tissues which envelope or enter into its composition, and the simultaneous effusion of serosity. Inflammation seldom or never accompanies the softening of this matter, and whenever ulceration or sloughing occur, they are owing entirely to the obliteration of the vessels of the texture, by the morbid product in its development pressing upon them. Our author sums up the physical characters of melanosis in the following words:—

> "This matter is quite opaque, and has no marked odour or taste. In its natural state, or when mixed with water, exposed to the air it becomes dry, brittle and pulverizable, and does not emit the odour of putrefaction until after a long period. When burnt, it swells, gives out a great deal of smoke, a marked empyreumatic odour, and is converted into a carbonaceous substance."

The chemical characters of true melanosis have been examined with great care and accuracy by LASSAIGNE, FOY, and BARRUEL, in France, and Dr. HENRY, of Manchester. Barruel asserts that melanosis of the human subject is composed of the colouring matter of the blood united with fibrine, both of them being in a peculiar condition, (*"se trouvant dans un etat particulier,"*) three distinct kinds of fatty matter, and a considerable quantity of the phosphate of lime and iron. Foy, after repeated examinations of melanotic tumours in the horse, reports as the result of his observation—

Albumen - - -	15.00	Muriate of potash - -	5.00
Fibrine - - -	6.25	Ditto, soda - - -	3.75
A highly carbonized principle, probably altered cruor	31.40	Carbonate of soda -	2.50
Water - - - -	18.75	Ditto, lime - - -	3.75
Oxyds of iron - -	1.75	Ditto, magnesia - -	1.75
Sub. phosphate of lime	8.25	Tartrate of potash - -	1.75

Thus it appears that melanosis is composed of the constituents of the blood, and derives its colouring principle from a highly carbonized principle analogous in some measure to the colouring matter of the blood. We shall present the anatomical characters of melanosis in the language of our author.

> "We have seen that the melanotic matter, in the form of a round tumour, may lie in immediate contact with the substance of the organ in which it is deposited, or may be bounded by a membranous capsule. When a single tumour of the latter description is divided, and a quantity of the melanotic matter is removed from it by pressure and ablution, a multitude of fine filaments and lamellæ are seen connected with the capsule, traversing its contents in every direction, and presenting an appearance resembling cellular tissue when distended with serosity."

> "When a number of melanotic tumours are grouped together, they are included in a common capsule, and separated from one another by their respective coverings, and portions of cellular tissue contained in the angular spaces sometimes left between them. It is in these filamentous and cellular tissue alone that blood-vessels or nerves are to be seen. Minute arteries and veins may be observed ramifying in both, but they never pass beyond the limits of these tissues. Large branches, and even trunks of arteries and veins, are sometimes found passing over the surface, or included in the aggregated masses of melanotic tumours.

Our author remarks, that melanoma is more frequently combined with carcinoma than any other morbid condition, although there is no similarity either in their anatomical, physical or chemical characters.

We shall now pass on to those depositions which are styled *spurious.* These products arise either from the introduction of carbonaceous matter into the organic textures, and are confined solely to the lungs, or from the action of chemical agents on the blood. The lungs under this form of disease present us with a black carbonaceous colour, which pervades all the tissues, and is distinctly recognised in the bronchial glands; the texture of the lung is rendered friable and more readily lacerable. Dr. CHRISTISON has reported in the Edinburgh Medical and Surgical Journal, No. 109, the result of his analysis of the black matter from a patient of Dr. J. C. GREGORY, which presents the following points of interest. The colour suffered no change when boiled in concentrated nitric acid; a strong solution of chlorine did not in the least affect it; caustic potash in a strong solution took up some animal matter, which, when filtered, gave us first an opaque black portion, which was followed by another of a pale yellowish colour. The black powder which remained upon the filter when dried, burned readily, and resembled the combustion of charcoal, leaving behind a pale gray ash.

A small portion of the black matter which remained after boiling in nitric acid was treated in the following manner. Having been well washed and dried, it was introduced into a glass ball, with a tube attached, which was subsequently drawn out by means of a spirit lamp flame to a fine bore.

> "On the application of a low red heat to the ball, there was disengaged, at the open end of the tube, a considerable quantity of gas, which had the odour of coal gas, and on the approach of a light, took fire, and burned with a dense white flame. In the tube a dark yellow fluid likewise condensed, which had very exactly the odour of impure coal-tar naptha, and became a soft mass on cooling, of the consistence of lard. This, when compressed between layers of filtering paper, yielded an oily stain to the paper, and left a white matter, which dissolved in boiling alcohol, and separated again on cooling, in minute obscure crystals."

Dr. Christison remarks, that in the result of this experiment, it is impossible not to recognise the ordinary products of the distillation of coal.

> "A gas," says he, "of the same quality was procured, and likewise a naphthous fluid holding in solution a crystalline principle, analogous to, if not identical with naphthaline."

The case cited above by Dr. Gregory, is pregnant with interest, since it clearly demonstrates the correctness of Laennec's view, that the discoloration of the lungs may take place by the inhalation of the carbonaceous matter from ordinary combustion. Dr. Carswell thinks that the uniform black hue of both lungs—the fact that no other organ takes on this character of degeneration—the frequent occurrence of disease in those who are constantly exposed to coal dust—and the identity of the colouring principle with the inhaled matter, clearly and conclusively demonstrate the origin and nature of spurious melanosis of the lungs.

Another form of spurious melanosis results from the operation of an acid chemical agent, acting upon the blood; and is confined to those organs in which this acid exists either as a healthy secretion, as in the stomach, or where it is occasionally produced by an alteration in the chemical condition of the contents of these organs, as in the intestines, from the anormal formation of a fluid or gaseous product. The blood when subjected to the action of these acids varies in colour from an orange tint to a deep black, the latter being the most frequent, and is found either while blood is yet contained in the vessels, and constitutes a part of the circulating mass, or extravasated in the cellular membrane, or upon the free surfaces of serous membranes, or poured out into the cavities of the hollow organs, thereby assuming the punctiform, ramiform, stratiform or liquiform arrangement.

When from any mechanical cause the circulating blood is retarded, or interrupted in its course, it is found to assume a darker hue, and this is particularly manifest in the venous capillaries, in which the circulation is not unfrequently entirely arrested, and a separation of the serous from the solid constituents of the blood takes place. The serum with the salts escape and are ultimately absorbed, leaving behind the fibrine, of a dark blackish hue; this change of colour according to Dr. STEVENS, is owing to the removal of the salts, which give to the blood its peculiar red colour. This form of melanosis is usually found in the respiratory or digestive organs.

In the lungs it is attributable to those diseases which obstruct the circulation. and is either confined to minute spots, or diffused generally through the entire organ. Laennec styles this discoloration the "*matière noire pulmonaire.*" This character of discoloration of the lungs may be distinguished from the melanosis of this organ, from its never assuming the globular form.

The black discoloration from stagnation in the digestive organ, presents nearly the same characters of spurious melanosis produced by the action of an acid; it is however always confined to the villous and follicular structures of the mucous membrane.

Ramollissement is a term applied by the French pathologists to a morbid state of the different textures, in which there is a diminution of their healthy and natural consistence. The cause of this state is referred to an undue vascularity or hyperæmia of the texture, and is therefore one of the ordinary attendants upon inflammation; but when we reflect upon the frequent occurrence of softening under circumstances of an entirely different character, in which, instead of an exalted action, we were warranted in the presumption, that the parts were in a state of anæmia, a diminished vascularity, we cannot but unite with Andral, in referring this form of lesion to a derangement of the nutritive apparatus, and the result of an interference with that vital force which binds together the integrant particles of the several tissues, and retains them in union. Any disturbance of the circulation by which the vitality of the textures would be assailed, either by an obstructed circulation, or an imperfect nutrition, dependent upon a scanty, or impoverished supply of food, would prove an efficient cause for the development of this morbid condition. Thus it is, that children born in a debilitated state, and cachectic individuals, are characterized by this degeneration, varying in intensity from the softened integuments and flabby flesh, to an entire and complete destruction of the different organs and tissues With the above principles before us, we can readily imagine how obliterated arteries may also become the cause of softening. To the changes which occur during life, may be added a similar state of things taking place after the death of the individual, and dependent entirely upon chemical and physical causes, viz. the solution of the mucous membrane by gastric juice; or the infiltration of the tissue by some of the fluids producing a species of maceration; or a loss of cohesion from the putrefactive decomposition.

Softening from inflammation, according to Dr. Carswell, arises from an accumulation of blood in the capillaries, followed by an effusion of serosity, and not unfrequently accompanied by the deposition of coagulable lymph or formation of pus. The assimilable materials are no longer furnished, and the function of nutrition is completely suspended.

"A diminution in the consistence of the tissue thus situated, follows; the degree of which, will vary with the duration of the suspended function, and the degree of cohesion possessed by the tissue in its normal condition."

The process of softening is carried on by the united operation of a mechanical and vital agent: the molecules no longer bound together by the vital power, in consequence of the nutritive action being arrested, the effused fluid insinuates itself between them, and thus mechanically effects an entire separation, the result of which is recognised in the lessened consistence of the original texture. The physical characters of *inflammatory softening* are found to vary not only with "the duration on which the softening depends, and the natural difference of consistence of the tissue on which it takes place, but also with the structure of the affected organ, and the quantity of blood which it contains."

The degree of inflammatory softening of the cerebral mass may range from a slight deviation from its natural consistence to a cream-like fluid. In the beginning of this change, the continuity of the organic particles is but little disturbed, and not entirely separated from the surrounding structure; while in the advanced stage the molecules are entirely separated, and a part of the broken down cerebral mass removed, and if the softening is circumscribed or partial, a line of demarcation between it and the healthy substance is distinctly visible. Ramollissement of this organ must present us with various hues, according to the amount of vascular turgescence, the change effected upon the colour of the circulating blood, and the effusion of serosity or formation of pus; nor does the stage in which we examine the morbid product exert an unimportant influence over the colour; for the first stage is always characterized by its redness, while it gradually subsides as the pathological state progresses. When the substance of the brain is cut in the early stage of ramollissement, where the vascularity of the part is in its greatest degree, the exposed surface is studded with dots from the effusion of blood by the lacerated capillaries, or marked with purple lines arranged in an arborescent manner, or as is frequently found, the blood is poured out, and generally diffused through the softened mass, presenting the appearance of hemorrhagic apoplexy; moreover the softened mass will sometimes assume a *leaden* hue, owing to the minute and complete injection of the capillaries, both arteries and veins.

Redness must not however be esteemed an invariable attendant upon ramollissement from inflammatory action, since the effusion of serum in large quantities by pressing upon the arterial capillaries may prevent the ingress of the red particles of the blood, and give rise to an anemic condition of the cerebral mass; this state of things is usually found after hydrocephalus. To this may be appended the yellow degeneration produced by the presence of pus, and is usually found in close proximity to the meninges of the brain.

Inflammatory softening of the mucous membrane.—"Softening of the mucous membranes in general is a very frequent occurrence, but it is much more so in some than in others, and most of all in the digestive mucous membrane."

The frequent occurrence of disease, and particularly of softening in the gastro-intestinal mucous membrane, constituted the basis of Broussais' theory of fever, and although it is not always the sequel of inflammatory action, still its dependence in so many instances upon this state of the vascular system, warrants the conclusion of the French pathologist, that it should be taken as a strong argument in support of his pathological views in reference to essential fever. To arrive at a satisfactory opinion on this subject, it is always necessary to ascertain how far the softening is the result of previous exalted action in the capillaries, and how much depends upon the ordinary loss of cohesion from putrefaction, or the action of the gastric juice after death.

> "Softening of the mucous membrane of these organs, (stomach and intestines,) presents, in regard to degree and extent, the same variety as in the brain. In the first stage the mucous membrane, instead of possessing that degree of cohesion peculiar to it, in different portions of the alimentary canal, and which permits of its being detached from the submucous tissue in pieces of considerable size, breaks when seized between the fingers or forceps; in the second stage, the edge of a scalpel, or even the finger passed lightly over its surface, converts it into a soft, somewhat opaque, creamy-looking pulp; and in the third stage it is so completely softened and detached, that a gentle stream of water poured on it from the height of a few inches, removes it entirely from the surface of the submucous tissue. It is important to observe that in all these stages the softened mucous membrane is more or less opaque; it does not present the transparency which accompanies softening from the chemical action of the gastric juice. In the former case, and in the last stage of softening, it resembles a mixture of flour and cold water or milk; in the latter, the same materials after having been submitted to the action of heat."

Of the extent to which inflammatory softening may be carried in this texture, Dr. Carswell remarks:—

> "The extent of inflammatory softening of the mucous membrane is extremely variable. It may be limited to a small portion, or comprehend nearly the whole membrane. It has been described as extending from the mucous membrane to the other tunics of the stomach and intestines, and terminating in perforation of these organs. Such, however, does not appear to me ever to be the result of inflammatory softening. It is the consequence of the chemical action of the gastric juice."

We might be disposed to admit our authors conclusions, were we not prone to deny the existence of this great and mighty solvent. Our incredulity is based entirely upon the evidence afforded by the advocates of the opposite view, and not a little increased by their contrary statements of its chemical characters and the various properties which it presents at different times. Some have proved it to abound in alkaline properties, others in the essential characteristics of an acid, and all unite in the opinion, that this fluid owes its chemical character in a great measure to the kind of food taken. This contrariety of evidence upon an important question would lead us to infer that its properties did suffer alteration; and if so, we must be sceptical of its existence, as a physiological agent, since we are not acquainted with any organ in the animal system which can vary its secretion in such essential particulars, for the mere accommodation of the habits or caprice of the animal. But if we were able to explain away the above objections, we should only give place to others equally or more formidable. It is judiciously observed by Sir C. BELL, that physiological principles can only be admitted when sustained by reference to anatomy; the importance and correctness of this position can be fully appreciated by contemplating the magnificent results of his investigations on the nervous system, which originated the remark. If then we turn our attention to the mucous membrane of the gastric cavity, we find it in no essential particular different from that of the intestinal canal; its villosities are analogous in every part of the alimentary tube; the muciparous glands in the stomach are the same in development and structure with those of the duodenum or ileum. The blood-vessel distribution is essentially the same. Where then are we to look for the source of this fluid? To the gastric glands of Sir EDWARD HOME? If we examine them with the microscope, they present us with no peculiarity; they are of the same structure and volume, and located in the same manner as the muciparous glands throughout the entire membrane. Should we be met with the assertion that a series of large glands has been distinctly traced at the cardiac extremity of the œsophagus in the beaver, wombat, granivorous birds, &c. which are strictly entitled to the appellation—gastric, and which may be presumed to be the apparatus for elaborating gastric juice; we would ask whether the fluid has ever been obtained from them, and whether they are not usually found developed in those animals which have an imperfect salivary apparatus, as for instance, about the œsophagus of birds? Dr. ELLIOTSON remarks, (justly we think,) that so far from their secreting gastric juices, as understood by many physiologists, they are merely salivary glands.

Although the mucous membrane of the stomach is more frequently the seat of this morbid process than any other portion, it is not to be inferred that it is attributable to the action of the gastric juice, since that part of the gastric mucous membrane, with which the gastric juice is usually in contact, viz. at the cul-de-sac, is not often found involved, but most generally it is confined to the pyloric portion.

Dr. Carswell does not agree with M. Louis, that the degeneration in bands or stripes is the result of inflammatory process. The colour of the mucous membrane under this form of lesion is either red or pale.

> "In the pale softening, the mucous membrane presents a pale grayish or yellowish gray tint, its natural colour being little altered; or it may be paler than natural, when it generally presents a milky aspect, owing to its being reduced to a thin layer, through which the colour of the submucous tissue is partially seen."

Inflammatory softening of the cellular tissue is one of the most important and interesting morbid states to which the attention of the pathologist is attracted, and more frequently overlooked from the presumption that the integrant parts or elementary structure of the organs are in a state of disease, and also from the prevalent opinion that the cellular tissue, in an eminent degree, resists morbid changes; but when we reflect upon its extreme vascularity, we readily recognise how it is brought under the influence of disease. When the cellular tissue surrounding or entering into the formation of the several organs is in a softened state, it is readily detected by the facility with which they are lacerated. The subcutaneous, submucous, and subserous cellular membranes are assumed to have lost their cohesive properties, when these textures are easily stripped off from their attachments. It is important to bear this in mind, as it will not unfrequently direct our attention to a diseased condition of the super-imposed membranes, which from their anemic state would not otherwise arrest the attention of a casual observer.

Obliteration of the arteries has only been traced as a cause of softening in the brain structure, and was first described by M. Rostan. It may arise either from ossific deposits or fibrous and cartilaginous degenerations of their coats; the extent of the morbid condition will depend upon the class of vessels primarily assailed; if the capillaries of a part are alone involved, it will be circumscribed and limited to that portion of the cerebral mass receiving blood from them; if on the other hand, the main trunk of the artery is the seat of the cause, as for instance, the internal carotid at its commencement, the entire mass supplied by its ramifications will be discovered to be in a state of degeneration. In the first case, the cause of the disease may be detected by working out the pulpy structure of the brain, when the minute vessels will be firm and not unfrequently entirely obliterated by the process of thickening; where the cause is seated in the main trunk it may escape the notice of the examiner, and can only be recognised by tracing the vessel from its origin upwards, which should never be neglected in autopsic examinations where this state of the encephalon is suspected.

The attention of pathologists was first directed to the softening of the mucous membrane of the stomach after death by JOHN HUNTER, as "*digestion of the walls of the stomach after death*," and was referred entirely to the action of gastric juice. Dr. Carswell is induced to believe from his experiments that this kind of softening is of frequent occurrence, and must be strictly attributed to the acid properties of the contents of the organ, for which reason he prefers using the term "*gastric acid.*"

There cannot be a doubt in the mind of any candid and impartial investigator, but that our author's judgment, in this matter is led captive by preconceived notions or prejudices, and incredulous as we are, as to the powers of this agent, for reasons above stated, we are not the less so, when we find the sweeping assertion, that all those lesions described by M. Cruveilhier as "*ramollissement gelatiniform*," and those by Louis, as "*ramollissement avec aminicissement, et la destruction de la membrane muqueuse de l'estomac*," are none other than the results of the solvent powers of the gastric acid.

In concluding our review of Dr. Carswell's work, as far as it has been issued from the press, we should remark that each form of lesion is illustrated by handsomely executed plates on stone, and coloured with a precision and care, which cannot fail to impress the reader with the conviction that is contemplating faithful representations of the alterations of structure described in the text. A. L. W.